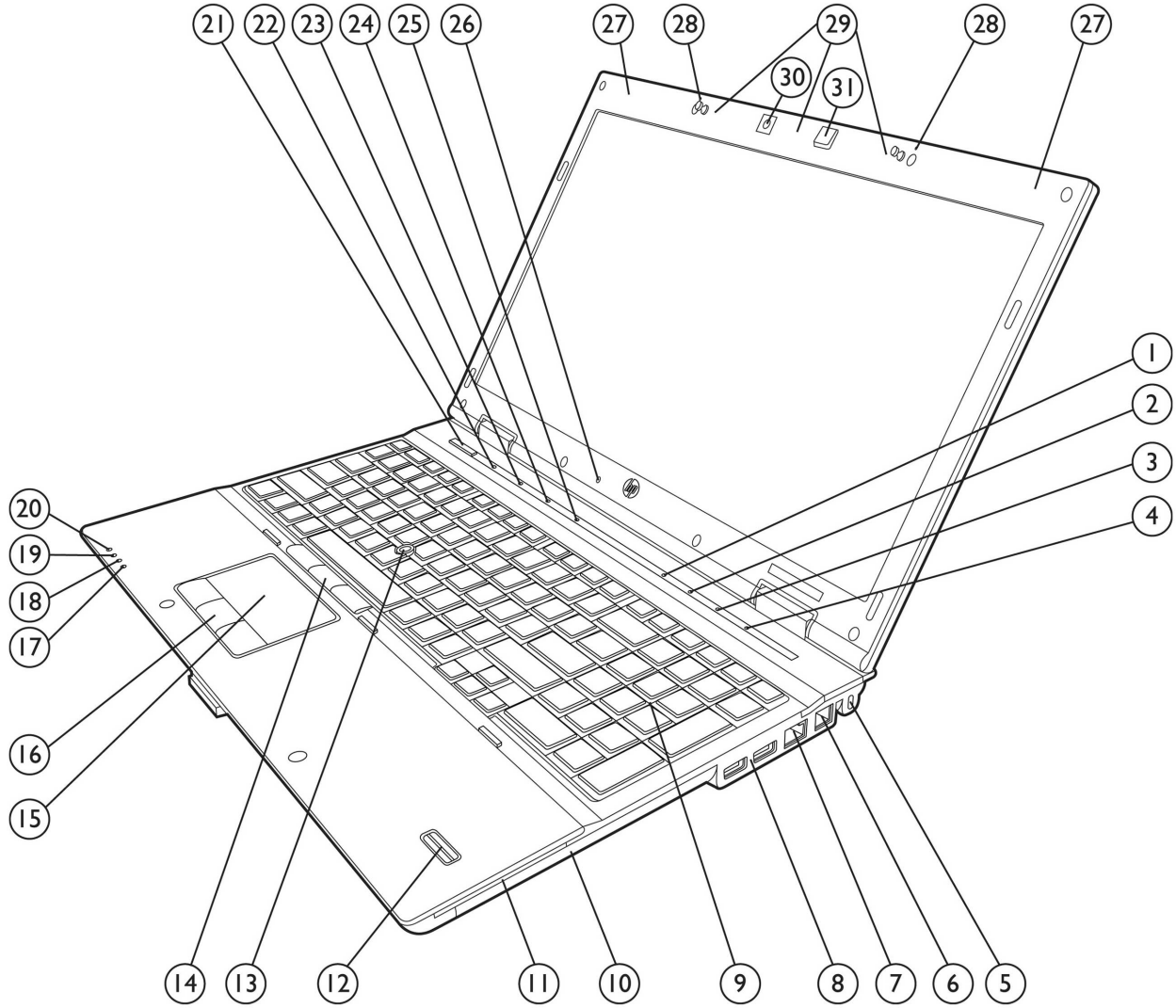
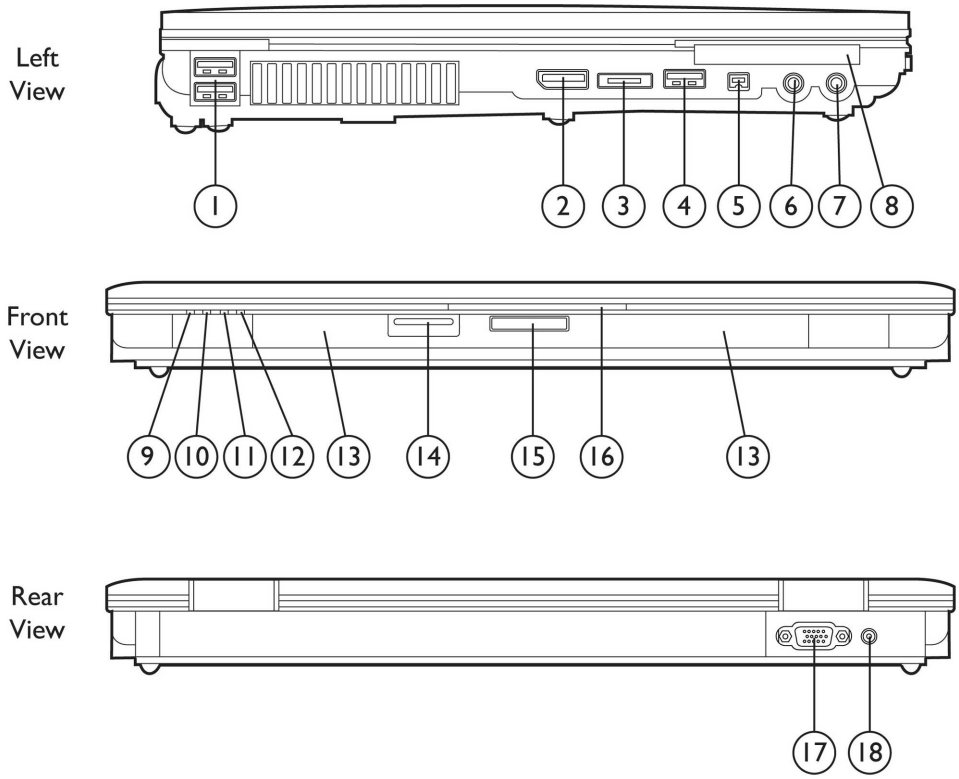
Overview



1. Volume mute button with LED indicator
2. Volume down button with LED indicator
3. Volume up button with LED indicator
4. Calculator button
5. Kensington Lock slot
6. RJ-11/modem port
7. RJ-45/Ethernet port
8. (2) USB 3.0 ports
9. Full numeric keypad
10. Upgrade Bay (optical drive, 2nd hard drive)
11. Integrated Smart Card Reader
12. HP Fingerprint Sensor
17. Hard drive activity / HP 3D DriveGuard LED indicator
18. Battery charging LED indicator
19. Power/standby LED indicator
20. Wireless on/off LED indicator
21. Power button with LED indicator
22. HP QuickLook 3 button with LED indicator
23. HP QuickWeb button with LED indicator
24. Wireless on/off button with LED indicator
25. Touchpad on/off button
26. Ambient Light Sensor
27. WWAN antennas
28. Dual-microphone array

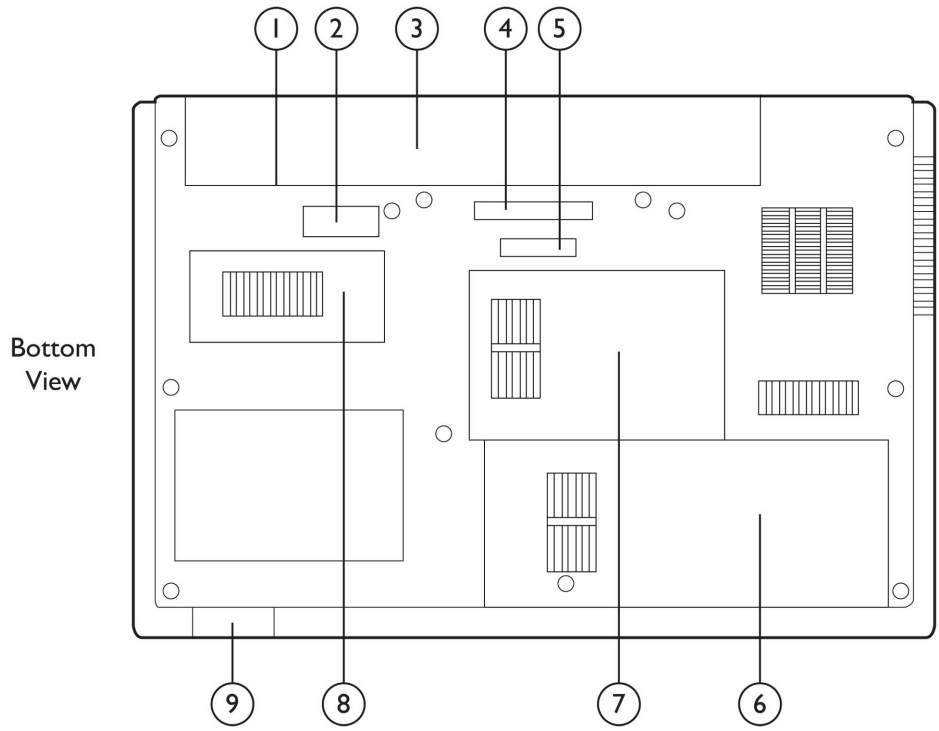
Overview

13. Pointstick
14. Pointstick buttons (3)
15. Touchpad with scroll zone
16. Touchpad buttons (3)
29. Three WLAN antennas
30. Optional 2 MP Webcam
31. HP NightLight with on/off button



1. (2) USB 2.0 ports
2. DisplayPort
3. eSATA port
4. USB 2.0 port
5. 1394a port
6. Stereo microphone in
7. Stereo headphone/line out
8. ExpressCard/54 slot
9. Wireless on/off LED indicator
10. Power/standby LED indicator
11. Battery charging LED indicator
12. Hard drive activity / HP 3D DriveGuard LED
13. Integrated stereo speakers
14. Media Card Reader
15. Display release latch
16. Business Card slot
17. VGA connector (external monitor/projector)
18. Power connector

Overview



1. SIM slot for WWAN (select models) - inside battery bay
2. Battery release latch
3. Battery bay
4. Docking connector
5. Secondary battery connector
6. Hard drive bay
7. Memory module compartment
8. WWAN module compartment
9. Bluetooth module compartment

At A Glance

- Genuine Windows 7 versions, Genuine Windows Vista versions, or FreeDOS
- Industrial, business rugged construction features a full magnesium alloy chassis, magnesium/aluminum display enclosure, metal alloy hinges, gun metal finish; designed to meet the military standard Mil-Std-810G for vibration, dust, humidity, altitude, and high and low temperature operation*
- NVIDIA Quadro FX 880M with 1 GB dedicated DDR3 memory or NVIDIA Quadro FX 1800M with1 GB dedicated GDDR5 memory, or ATI FirePro M5800 with 1 GB dedicated DDR3 memory
- Intel® Core™ i7 or Core i5 processor with Intel Turbo Boost Technology
- HP Performance Advisor for optimal configuration, compatibility and performance
- Fully ISV certified for workstation reliability and graphics-intense applications
- Widescreen 15.6-inch diagonal 16:9 LED-backlit HD+, or FHD display with optional DreamColor; Ambient Light Sensor, optional HP Privacy Filter
- DisplayPort for external monitors, eSATA port for external storage, two USB 3.0 ports for faster transfer speeds to USB 3.0 peripherals and compatibility with USB 2.0 peripherals, three USB 2.0 ports
- Upgrade Bay for easy optical drive upgrade or optional second hard drive for RAID 1 Mirroring or RAID 0 Striping
- Choice of standard 8-cell primary battery or HP Long Life battery, plus optional external batteries – HP Ultra-Capacity Battery, HP Extended Life Battery
- Flexible wireless connectivity options:
  - Integrated HP un2420 EV-DO/HSPA Mobile Broadband Module provides worldwide Gobi mobile Internet technology with GPS

Overview

  - Integrated Intel Centrino® Ultimate-N 6000 Series 802.11 a/b/g/n wireless LAN module
  - Bluetooth® v2.1
- Choice of 7200 rpm user-removable hard drive up to 500 GB with HP 3D DriveGuard protection, or 160/256 GB Solid State Drive
- HP Power Assistant to conserve power, increase battery run-time, monitor power needs, report workforce power consumption
- Enhanced security features including integrated Smart Card Reader, HP ProtectTools, Computrace LoJack Pro ready, HP SpareKey, HP Disk Sanitizer, TPM 1.2 ;** optional HP Fingerprint Sensor, and optional HP Privacy Filter
- Touch-sensitive controls for HP QuickLook 3 (instant access to email, calendar, contacts and tasks), HP QuickWeb, wireless on/off, touchpad on/off, mute, volume down, volume up, and calculator
- Optional 2-MP Webcam with Business Card Reader Software
- HP Night Light
- Dual pointing devices (touchpad with scroll zone and pointstick)
- ExpressCard/54 slot, Media Card Reader

* Testing was not intended to demonstrate fitness for DOD contracts requirements or for military use. Test results are not a guarantee of future performance under these test conditions.
** TPM module disabled where not permitted by law (for example, Russia and China).

Standard Features

Processors	Intel Quad-Core Processors	
	Intel Core i7-840QM Processor (1.86 GHz, 8 MB L3 cache)* Up to 3.20 GHz with Intel Turbo Boost Technology	
	Intel Core i7-820QM Processor (1.73 GHz, 8 MB L3 cache)* Up to 3.06 GHz with Intel Turbo Boost Technology	
	Intel Core i7-740QM Processor (1.73 GHz, 6 MB L3 cache)* Up to 2.93 GHz with Intel Turbo Boost Technology	
	Intel Core i7-720QM Processor (1.60 GHz, 6 MB L3 cache)* Up to 2.8 GHz with Intel Turbo Boost Technology	
	Intel Dual-Core Processors	
	Intel Core i7-640M Processor (2.80 GHz, 4 MB L3 cache)* Up to 3.46 GHz with Intel Turbo Boost Technology	
	Intel Core i7-620M Processor (2.66 GHz, 4 MB L3 cache)* Up to 3.33 GHz with Intel Turbo Boost Technology	
	Intel Core i5-560M Processor (2.66 GHz, 3 MB L3 cache)* Up to 3.20 GHz with Intel Turbo Boost Technology	
	Intel Core i5-540M Processor (2.53 GHz, 3 MB L3 cache)* Up to 3.06 GHz with Intel Turbo Boost Technology	
	Intel Core i5-520M Processor (2.4 GHz, 3 MB L3 cache)* Up to 2.93 GHz with Intel Turbo Boost Technology	
	* Intel's numbering is not a measurement of higher performance. NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.	
Operating System	Preinstalled	Genuine Windows 7 Professional Edition 32* Genuine Windows 7 Professional Edition 64* Genuine Windows Vista Business 32** FreeDOS
	Supported	Genuine Windows Vista Enterprise 32** Genuine Windows Vista Enterprise 64** Genuine Windows XP Professional 64
	Certified	SuSE Linux Enterprise Desktop 11
	* System may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See: http://www.microsoft.com/windows/windows-7/ for details. ** Certain Windows Vista product features require advanced or additional hardware. See: http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor.	
Chipset	Mobile Intel QM57 Express Chipset	

Standard Features

Intel Core i5 with vPro/Core i7 with vPro technology capable	Intel Core i5 with vPro and Core i7 with vPro technology is a selectable feature that is available on units configured with an Intel Centrino® Ultimate-N 6000 series WLAN module and a preinstalled Windows operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel Active Management Technology (AMT) offers built-in manageability and proactive security for networked notebook PCs, even when they are powered off* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update PCs regardless of their power state. *Requires a Windows operating system, network hardware and software, connection with a power source, and a direct (non-VPN) corporate network connection which is either cable or wireless LAN. NOTE: Some functionality of Intel Core i5 with vPro/Core i7 with vPro technology, such as Intel Active Management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel Core i5 with vPro/Core i7 with vPro technology is dependent on 3rd party software providers. Compatibility with future "virtual appliances" is yet to be determined.	
Graphics	ATI FirePro M5800 graphics with 1 GB dedicated DDR3 video memory Microsoft DirectX 11 (Shader Model 4.1) and OpenGL 3.2 capable NVIDIA Quadro FX 880M graphics with 1 GB dedicated DDR3 video memory NVIDIA Quadro FX 1800M graphics with 1 GB dedicated GDDR5 video memory	
Display	Internal	15.6-inch diagonal 16:9 LED-backlit HD+ anti-glare (1600 x 900 resolution) 15.6-inch diagonal 16:9 LED-backlit FHD anti-glare (1920 x 1080 resolution) 15.6-inch diagonal 16:9 LED-backlit FHD anti-glare DreamColor (1920 x 1080 resolution) Ambient Light Sensor Optional HP Privacy Filter
	External	Up to 32-bit per pixel colour depth DisplayPort supports resolutions up to 2560 x 1600, 30-bit colour depth at 60 Hz, and full HD (1920 x 1080) monitors, 24-bit colour depth at 120 Hz VGA port supports resolutions up to 2048 x 1536 at 75 Hz, and lower resolutions at up to 100 Hz DVI-D (single link) video signal available through DVI port in optional HP Docking Station (sold separately) supports resolutions up to 1600 x 1200 at both full and reduced blanking, and 1920 x 1200 at reduced blanking NOTE: Resolutions are dependent upon monitor capability, and resolution and colour depth settings.

Standard Features

Memory	Standard	DDR3 PC3-10600 SDRAM (1333 MHz)* Two or four SODIMM slots supporting dual-channel memory 2048 MB, 4096 MB, and 8192 MB SODIMMs NOTE: Four memory slots only on models with quad-core processor.
	Maximum	Upgradeable to 32768 MB with (4) 8192 MB SODIMMs
	Dual-channel	Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

* With some processors, memory bus runs at a maximum of 1066 MHz.
NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires a Windows 64-bit operating system or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Communications	Integrated Intel Gigabit Network Connection (10/100/1000 NIC)* 56K V.92 modem**	

* The term "10/100/1000" or "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

** Designed for downloads from 56K modem compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with line conditions. Modem availability is subject to country regulatory approval.

Wireless Devices

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Wireless LAN is factory configurable or available as an option to be added later. Mobile Broadband (WWAN) requires a Windows operating system and is available in select countries as a standard, factory configurable feature or as an option to be added later. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

HP un2420 EV-DO/HSPA Mobile Broadband Module	Integrated mobile broadband module with Gobi global mobile Internet technology that provides connectivity to both CDMA (EVDO) and UMTS (HSPA) networks. It also provides GPS functionality for various mapping applications and security applications such as Computrace LoJack Pro Premium for HP ProtectTools. NOTE: Separately purchased mobile network operator service is required. Two 850/900/1575/1800/1900/2100 MHz antennas integrated in the top of the display panel support current and future WWAN technologies.
All 802.11 integrated wireless LAN options	Wi-Fi Certified* Cisco Compatible Extensions support Wired Equivalent Privacy (WEP) support up to 128-bit keys Wi-Fi Protected Access (WPA) and WPA2 support 802.1x authentication support, including EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, and LEAP Advanced Encryption Standard (AES) support Three antennas integrated in the display enclosure

Standard Features

	Intel Centrino Ultimate-N 6300 (3x3)	Integrated support for 802.11a, b, g, and n* 3 transmit, 3 receive antennas Up to 450 mbps data rate
	Intel Centrino Advanced-N 6200 (2x2)	Integrated support for 802.11a, b, g, and n* 2 transmit, 2 receive antennas Up to 300 mbps data rate
	HP Integrated Module with Bluetooth Wireless Technology	Bluetooth Specification v2.1 compliant Works with a wide range of Bluetooth devices

* In countries where 802.11n is not allowed, this capability is not enabled (802.11a/b/g only).

Keyboard

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and a drain system that funnels fluid through a hole in the bottom of the notebook. This minimizes the risk of damage to sensitive components underneath. The 101/102-key compatible keyboard features an industry standard, full-pitch key layout with desktop keyboard features, such as the isolated inverted-T cursor control keys, editing keys, both left and right control and alt keys, and 12 function keys. U.S. and International key layouts are available. Includes a full numeric keypad, hotkeys for instant access to power conservation, brightness, and other features. It has 19.05 x 19.05 mm key pitch (center-to-center spacing) and 2.5 mm stroke.

HP DuraKeys is a clear coating applied over the notebook keyboard that helps protect the finish and the printed characters on the keys. HP DuraFinish helps protect the finish on the keyboard deck, graphics, and icons from normal wear and tear.

Touch-sensitive controls

Touch-sensitive controls provide easy access to the following features: HP QuickLook 3, HP QuickWeb, wireless on/off, touchpad on/off, volume mute, volume down, volume up, and calculator button.

Dual Pointing devices

Touchpad with scroll zone, three pick buttons
Pointstick with three additional pointstick buttons

Expansion card slots

ExpressCard/54 slot	Supports ExpressCard/54
Integrated Smart Card Reader	Compatible with ISO 7816 compliant Smart Cards PC/SC interface support
Media Card Reader	Supports SD (Secure Digital), MMC (MultiMedia Card), Memory Stick, Memory Stick Pro, Memory Stick Duo*, xD-Picture card

* Memory Stick Duo Adapters are required and sold separately. Inserting a Memory Stick Duo Card directly into your notebook could damage the memory card and/or notebook.

Standard Features

Internal Storage	Hard Drives	250/320/500 GB 7200 rpm SMART SATA II 320 GB 7200 rpm SMART SATA II Self Encrypting Drive
	NOTE: These hard drives are customer removable and will withstand multiple insertion/removal cycles. Up to 15 GB is reserved for the system recovery software.	
	HP 3D DriveGuard (Windows only)	The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive. Uses three-axis digital motion detection with intelligent sensitivity to help protect the hard drive during normal use from shock and vibration. The digital accelerometer temporarily halts all data transfer and parks the hard drive when abrupt motion is detected.
	Solid State Drives	160 GB Solid State Drive 256 GB Solid State Drive
Upgrade Bay	Fixed 12.7 mm SATA optical drive	Blu-ray R/RE DVD+/-RW SuperMulti DL Drive DVD+/-RW SuperMulti DL LightScribe Drive DVD-ROM Drive
	Second hard drive	500 GB 7200 rpm SMART SATA II Hard Drive
Interfaces	ExpressCard/54 slot	One
	External monitor	Two – (1) DisplayPort, (1) VGA
	Media Card Reader	One
	1394a	One
	Stereo microphone in	One
	Stereo headphone/line out	One
	Power connector	One
	RJ-11/modem	One
	RJ-45/Ethernet	One
	USB 2.0	Three
	USB 3.0	Two (for USB 2.0 and USB 3.0 peripherals)
	eSATA	One
	Docking connector	One
	Secondary battery connector	One

Standard Features

Audio/Visual

HD audio (HP Premier Sound)
Integrated stereo speakers
Integrated dual-microphone array
Touch-sensitive controls for volume up, volume down, and mute
Stereo headphone/line out
Stereo microphone/line in

Optional 2 MP webcam

- Supports videoconferencing and still image capture
- Large image sensor for excellent colour matching and good low light sensitivity
- Up to 30 frames/sec
- AutoMacro focus lens
- Video capture at VGA, 1.3 Mpixel, and 2 Mpixel resolutions
- 16-bit true colour (camera sensors output YCrCb format among others)

Software

Preinstalled software with Windows operating system

HP Recovery Manager (available with Windows 7 or Vista only)
HP Support Assistant (available with Windows 7 or Vista only)
HP ProtectTools Security Manager
HP QuickLaunch Buttons Software
HP QuickLook 3
HP QuickWeb
HP Power Assistant
HP Connection Manager
HP Wireless Assistant
Microsoft Office 2010 preloaded (purchase of a Product Key required to activate a full Office 2010 suite)*
McAfee Total Protection**
PDF Complete Special Edition***
Roxio Creator Business 10 (select models)
InterVideo WinDVD (select models)
Synaptics Touchpad Driver
HP Webcam Software
WinZip 14.5

Additional software available from the web

HP SoftPaq Download Manager
HP Client Manager Software
HP Client Management Solutions
Java Card Security for HP ProtectTools

* Microsoft Office 2010 Preloaded includes reduced functionality versions of Word and Excel. Purchase of Product Key required to activate full Office 2010 suite available at participating resellers/retailers and http://www.office.com.
** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.
*** 60 day trial; purchase license afterwards for full functionality.

Standard Features

Planned Workstation ISV Certifications	MCAD (Mechanical CAD/Architectural Engineering and Construction)	AutoDesk AutoCAD AutoDesk Inventor AutoDesk Revit AutoDesk AliasStudio AutoDesk Map 3D AutoDesk Civil 3D Bentley InRoads XM Bentley Microstation Bentley Navigator CEI CoCreate OneSpace Dassault Systemes CATIA V5 ICEM Surf Intelligent Light MSC Software MSC.Patran MSC Software SimXpert PTC Pro/ENGINEER Wildfire SensAble Siemans PLMS NX Siemans PLMS NX I-deas Siemans PLMS Solid Edge Siemans PLMS TeamCenter Visualization Solidworks
	DCC (Digital Content Creation)	Adobe Premiere Adobe After effects Adobe Encore Adobe Photoshop AutoDesk 3DS MAX/Combustion AutoDesk Maya Avid Xpress Pro Avid Media Composer SoftImage XSI
	GIS (Geographic Information Systems)	ESRI ArcGIS
	Oil and Gas	Landmark R5000 Paradigm EPOS, GoCAD Schlumberger / GeoFrame Schlumberger Petrel SeismicMicro Technology

HP Performance Advisor	HP Performance Advisor enables optimal configuration of HP Mobile Workstations delivering stability and best performance. HP Performance Advisor will guide your system setup allowing a "custom" configuration that best matches the workstation to user requirements.

Standard Features

HP Recovery Manager	Models shipped with Windows 7 or Windows Vista include HP Recovery Manager. HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 15 GB of the hard drive is reserved for the system recovery software.

Security	Standard Features	HP ProtectTools Security Manager Enhanced Pre-Boot Security HP SpareKey HP Fingerprint Sensor One-Step Logon Setup Password DriveLock Password TPM 1.2 Embedded Security Chip* TPM Enhanced DriveLock* HP Disk Sanitizer Kensington Lock slot Support for Computrace** LoJack Pro for HP ProtectTools	
	Optional Features	HP Fingerprint Sensor	Enhanced sensor scans the fingerprint to uniquely identify and authenticate a person.
		HP Privacy Filter	Narrows viewing area so that screen data is visible only to persons directly in front of the monitor.
		Computrace** LoJack Pro Premium for HP ProtectTools with GPS Tracking	Subscription based security solution providing the ability to track, initiate physical recovery, conduct asset management, and perform remote data delete by utilizing GPS technology. GPS functionality requires HP un2420 EV-DO/HSPA Mobile Broadband Module.

* TPM module disabled where use is restricted by law; for example, Russia and China.
** The Computrace agent is shipped turned off, and must be activated by customers when they purchase a subscription with terms ranging from one to five years.
For more information on HP security solutions refer to: http://www.hp.com/go/security.

HP ProtectTools Security Manager	HP ProtectTools Security Manager is the security platform for business notebooks and desktops. The HP ProtectTools Security Manager is an extensible client security console that delivers enhanced security capabilities through add-on software modules. The following modules are available on the hard drive (also downloadable from the web) and can be configured in Software Setup: • Credential Manager for HP ProtectTools • Device Access Manager for HP ProtectTools • Drive Encryption for HP ProtectTools • File Sanitizer for HP ProtectTools • Privacy Manager for HP ProtectTools (Chat & Sign) • Embedded Security for HP ProtectTools • Computrace LoJack Pro for HP ProtectTools

Standard Features

Power Supply

External 150-watt Smart AC adapter
External 120-watt Smart AC adapter
External 90-watt Smart AC adapter

Recommended AC Adapter		
	Intel dual-core processor	Intel quad-core processor
NVIDIA Quadro FX 880M graphics	90W	120W
NVIDIA Quadro FX 1800M graphics	120W	150W
ATI FirePro M5800 graphics	120W	150W

Power cord included is 6-foot (1.8 metre).
Total length including external AC adapter is 12 feet (3.66 metre).
HP Fast Charge*

*HP Fast Charge recharges your battery up to 90% within 90 minutes when the system is off. HP Fast Charge does not apply to the HP Ultra-Capacity Battery or the HP Long Life Battery.

Battery

Primary battery	HP 8-cell 73 WHr Li-Ion Primary Battery
	HP Long Life 8-cell 68 WHr Li-Ion Primary Battery
Optional secondary battery	HP Extended Life Battery (8-cell 52 WHr)
	HP Ultra-Capacity Battery (12-cell 95 WHr)

Battery Life

HP 8-cell (73 WHr)	Up to 5 hours and 30 minutes
with optional HP Extended Life Battery	Up to 10 hours
with optional HP Ultra-Capacity Battery	Up to 13 hours
HP Long Life 8-cell (68 WHr)	Up to 4 hours and 45 minutes

NOTE: Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark07 battery benchmark www.bapco.com/products/mobilemark2007 for additional details.

System Standby Time Up to 2 weeks

Power Conservation

Supports enhanced Intel SpeedStep technology (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)
NVIDIA PowerMizer 7.0 technology
Hibernation
Standby
ACPI compliance

Standard Features

Docking and Stands	HP Docking Station HP Advanced Docking Station HP USB 2.0 Docking Station HP Essential USB 2.0 Port Replicator HP Dual-Monitor Stand HP Monitor Stand HP Basic Adjustable Stand HP Adjustable Notebook Stand NOTE: Some HP Docking stations may not support every feature of some HP Notebook models. Please refer to the individual docking station documentation for specific information about supported features.
Service and Support	HP Services offers limited 3-year warranty; 1-year limited warranty on primary battery. On-site service and warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Centre for details. http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp.

Options

Memory	HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
	HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA
Storage	HP Upgrade Bay SATA DVD+/-RW SuperMulti DL LightScribe Drive	AK869AA
	HP 250GB Pocket Media Drive	FE477AA
	HP External USB Drive CD/DVD R/RW	FS943AA
	HP Upgrade Bay SATA 500 GB 7200 rpm Hard Drive	AU097AA
	HP Primary SATA 500 GB 7200 rpm Hard Drive	AU098AA
	HP Primary SATA 320 GB 7200 rpm Hard Drive	AS282AA
Expansion Solutions	HP Docking Station	VB043AA
	HP Advanced Docking Station	NZ223AA
	HP USB 2.0 Docking Station	FQ834AA
	HP Essential USB 2.0 Port Replicator	AQ731AA
	HP Dual Hinge Notebook Stand	AW661AA
	HP Display & Notebook Stand	AW662AA
	HP Adjustable Display Stand	AW663AA
	HP Adjustable Dual Display Stand	AW664AA
Communications	HP un2420 EVDO/HSPA Mobile Broadband Module	WD301AA
Power	HP 230W Smart Adapter	AT895AA
	90W Smart AC/Auto/Air Combo Adapter	AJ652AA
	150W Smart AC Adapter	AL192AA
	HP Smart 65W Travel AC Adapter	AU155AA
	90W Smart AC Adapter	ED495AA
	HP 8500/8700 Series 8-Cell Battery	KU533AA
	HP Extended Life Battery	AJ359AA
	HP Ultra-Capacity Battery	AT486AA

Options

Carrying Cases	HP Deluxe Nylon Backpack	RR317AA
	HP Deluxe Roller Case	GD405AA
	HP Basic Backpack	AM863AA
	HP Basic Messenger	AP355AA
	HP Basic Carrying Case	AJ078AA
	HP Professional Series Carrying Case	AT886AA
	HP Professional Series Backpack	AT887AA
	HP Professional Series Messenger	AT888AA
	HP Professional Series Designer Tote	AT889AA
	HP Professional Series Slip Case	AT890AA
	HP Elite Series Designer Tote	AT891AA
	HP Elite Leather Top Load Case	AX675AA
	HP Elite Leather Messenger	AX676AA
	HP Executive Top Load Case	AX677AA
	HP Executive Messenger	AX678AA
	HP Elite Top Load Case	AX679AA
	HP Elite Slim Top Load Case	AX680AA
	HP Professional Slim Top Load Case	AY530AA
	HP Value Nylon Case	RR314AA
	HP Universal Nylon Case	RR315AA
	HP 16.1 Slip Case with Integrated Fan	AY463AA
	HP 16.1 Quick Case with Integrated Fan	AY466AA
Security	HP/Kensington MicroSaver Cable Lock	PC766A
	HP Compaq Notebook Cable Lock	AY475AA
	HP Privacy Filter for 15.6-inch Display	AU103AA
	HP ExpressCard Smart Card Reader with Java Card	AJ451AA

Options

Input/Output Devices	HP PS/2 Keyboard & Mouse Bundle	RC464AA
	HP USB Keyboard & Mouse Bundle	RC465AA
	HP USB Optical Travel Mouse	RH304AA
	HP Wireless Mouse	AR085AA
	Desktop Mouse	DA700AV
	HP BT Headset	AR084AA
	HP Mobile Audio Speakers	FS944AA
	HP Mobile Productivity Bundle	AQ729AA
	HP Mobile Bluetooth Presenter Mouse	GK872AA
	HP Notebook Companion Projector	AX325AA
	HP DreamColor Advanced Profiling Solution	KZ300AA
	HP Premium Autofocus Webcam	KQ245AA
	Premium Digital Headset	KJ270AA

Memory

DDR3 PC3-10600 SDRAM (1333 MHz)*
Two or four SODIMM slots supporting dual-channel memory
SODIMM sizes supported: 2048 MB, 4096 MB, and 8192 MB
NOTE: Four memory slots only on models with quad-core processor.

Standard Memory

- 2048 MB (2048 MB x 1)
- 4096 MB (4096 MB x 1)
- 4096 MB (2048 MB x 2)
- 8192 MB (4096 MB x 2)
- 8192 MB (2048 MB x 4)**
- 12288 MB (4096 MB x 2 + 2048 MB x 2)**
- 16384 MB (8192 MB x 2)
- 16384 MB (4096 MB x 4)**
- 32768 MB (8192 MB x 4)**

Optional Memory Upgrades

Support for up to 32768 MB of memory with the installation of optional DDR3 SDRAM memory kits. All memory slots are user-accessible. Please refer to the Hardware and Software Guide for installation procedures. Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

	Channel A		Channel B	
Up to	Slot 1	Slot 2	Slot 3	Slot 4
2048 MB	2048 MB		Empty	
4096 MB	4096 MB		Empty	
4096 MB	2048 MB		2048 MB	
8192 MB	4096 MB		4096 MB	
8192 MB**	2048 MB	2048 MB	2048 MB	2048 MB
12288 MB**	4096 MB	2048 MB	4096 MB	2048 MB
16384 MB	8192 MB		8192 MB	
16384 MB**	4096 MB	4096 MB	4096 MB	4096 MB
32768 MB**	8192 MB	8192 MB	8192 MB	8192 MB

* With some processors, memory bus runs at a maximum of 1066 MHz.
** Requires quad-core processor configuration with four memory slots.

NOTE: This chart does not represent all possible memory configurations. Due to the non-industry standard nature of some third-party memory modules, we strongly recommend using only HP-branded memory modules to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed. Full availability of 4 GB or more of memory requires a Windows 64-bit operating system or Linux. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Memory Upgrades

HP 2 GB (DDR3 1333 MHz) SODIMM	AT912AA
HP 4 GB (DDR3 1333 MHz) SODIMM	AT913AA

Upgrade Bay Drive Support

	Quantity Supported	Drive Bay
Blu-ray R/RE DVD+/-RW SuperMulti DL Drive	One	Upgrade Bay
DVD+/-RW SuperMulti DL LightScribe Drive	One	Upgrade Bay
DVD-ROM Drive	One	Upgrade Bay
500 GB 7200 rpm SMART SATA II Hard Drive	One	Upgrade Bay

Internal Storage Device

	Quantity Supported	Drive Bay
Hard Drives		
500 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
320 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
320 GB 7200 rpm SMART SATA II Self Encrypting Drive	One	Dedicated hard drive bay
250 GB 7200 rpm SMART SATA II Hard Drive	One	Dedicated hard drive bay
Solid State Drive		
256 GB Solid State Drive	One	Dedicated hard drive bay
160 GB Solid State Drive	One	Dedicated hard drive bay

System Unit	**Dimensions** (HxWxD)	1.28 in (at front) x 14.7 in x 9.9 in 32.4 mm (at front) x 373.5 mm x 251.5 mm	
	Weight	Starting at 6.37 lb (2.89 kg)	
	NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes hard drive, optical drive, and wireless.		
	Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	18.5 V
		Average Operating Power	27.0 W
		Max Operating Power	< 90 W or < 120 W or < 150 W
	Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Relative Humidity	Operating	10% to 90%, non-condensing
		Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
	Shock	Operating	125 G, 2 ms, half-sine
		Non-operating	200 G, 2 ms, half-sine
	Random Vibration	Operating	0.75 grms
		Non-operating	1.50 grms
	Altitude (unpressurized)	Operating	–50 to 10,000 ft (–15.24 to 3,048 m)
		Non-operating	–50 to 40,000 ft (–15.24 to 12,192 m)
	Industry Standard Certifications	UL	Yes
		CSA	Yes
		FCC Compliance	Yes
		ENERGY STAR®	Select models*
		EPEAT	Registered TBD in United States**
		ICES	Yes
		GS	Yes
		Australia / NZ A-Tick Compliance	Yes
		CCC	Yes
		Japan VCCI Compliance	Yes
		KCC	Yes
		BSMI	Yes
		CE Marking Compliance	Yes
		BNCI or BELUS	Yes
		CIT	Yes
		GOST	Yes

	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes
	UKRSERTCOMPUTER	Yes

* Configurations of the HP EliteBook 8540w that are ENERGY STAR qualified are identified as HP EliteBook 8540w ENERGY STAR on HP websites and on www.energystar.gov.

** EPEAT TBD Registered in U.S. EPEAT registration varies by country. See www.epeat.net for registration status by country.

NOTE: For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

HP 150W Smart AC Adapter	Dimensions	6.65 x 2.76 x 1.57 in (16.9 x 7.0 x 4.0 cm)	
	Weight	1.54 lb (700 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	2.2 A at 90 VAC, 1.1 A at 180 VAC
	Output	Output power	150W
		DC Output Voltage	19.0V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<15A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating Temperature	32° to 104° F (0° to 35° C)
		Non-operating (storage) Temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark- full compliance with LVD and EMC directives; Worldwide safety standards- IEC950, EN60950, UL1950, Class 1, SELV; Agency approvals- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.	

Technical Specifications

HP 120W Smart AC Adapter	Weight	1.52 lb (0.69 kg) (adapter) 0.29 lb (0.13 kg) (power cord)	
	Dimensions	6.65 x 2.56 x 1.50 in (16.9 x 6.5 x 3.8 cm)	
	Input	Operating Input Voltage	100 to 240 VAC
		Operating Input Current	PFC Version: 2.20 A at 90 VAC 1.10 A at 180 VAC Non-PFC Version: 2.5 A at 110 VAC 1.25 A at 180 VAC
		Operating Frequency Range	47 to 63 Hz AC
		Efficiency	83% minimum at 115 VAC
	Output	Output power	120 W
		DC Output Voltage	18.5 V
	Environmental Design	Operating Temperature	32° to 104° F (0° to 35° C)
		Non-operating (storage) Temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark: full compliance with LVD and EMC directives Worldwide safety standards: IEC60950, EN60950, UL60950, Class2, SELV Agency approvals: C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE, S-Mark, Australian Electric Permit, PSB, eK, BSMI, BNCI, KONCAR, GS, GOST, SASO, SABS, UKRSERTCOMPUTER; MTBF- over 200,000 hours at 25°C ambient condition.	

HP 90W Smart AC Adapter	Dimensions	5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm)	
	Weight	0.82 lb (370 g)	
	Input	100 to 240 VAC	
		Input Efficiency	83% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.5 A at 90 VAC, 0.75 A at 180 VAC PFC Version
			2.4 A at 90 VAC, 1.2 A at 180 VAC NON PFC Version
	Output	Output power	90W
		DC output	19.0V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown

Connector	3 pin/grounded, mates with interchangeable cords	
Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
	Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)
	Altitude	0 to 10,000 ft (0 to 3,048 m)
	Humidity	20% to 80%
	Storage Humidity	10% to 90%
EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.	

NOTE: Unless otherwise noted, temperature limits listed in the following component specifications relate to the internal temperatures of these components and not to the environment in which the PC is operating.

Optional HP Ultra-Capacity Battery	Dimensions (H x W x L)	1.3 x 6.0 x 10.6 in (3.33 x 15.25 x 26.88 cm)	
	Weight	1.77 lb (0.803 kg)	
	Cells/Type	12-cell Lithium-Ion	
	Energy	Watt-hour Capacity	95 Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	Smart Adapter	3 to 4 hours
		System ON	4 to 5 hours (depending on system power consumption)
	Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery	

Technical Specifications

Optional HP Extended Life Battery	Dimensions (H x W x L)	1.0 x 3.9 x 8.7 in (2.5 x 10.0 x 22.0 cm)	
	Weight	1.00 lb (0.455 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Watt-hour Capacity	52 Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	3 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 90 minutes when system is OFF
	Fuel Gauge	When pressed, LEDs light indicating level of charge remaining on battery	
HP 8-Cell 73 Wh Lithium-Ion Primary battery	Dimensions (HxWxL)	0.8 x 1.9 x 10.6 in (2.0 x 4.8 x 27.0 cm)	
	Weight	0.980 lb (0.445 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Watt-hour Capacity	73 Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
		HP Fast Charge Technology	Charges the battery up to 90% within 1.5 hours when system is OFF
HP Long Life 8-Cell 68 Wh Primary battery	Dimensions (HxWxL)	0.8 x 1.9 x 10.6 in (2.0 x 4.8 x 27.0 cm)	
	Weight	0.930 lb (0.420 kg)	
	Cells/Type	8-cell Lithium-Ion	
	Energy	Watt-hour Capacity	68 Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)

Displays

15.6-inch LED HD+ (1600 x 900) anti-glare	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	200 nits (typ)	
	Pixel Resolution	Pitch	0.2151mm
		Format	1600 x 900
		Configuration	RGB Strip
	Backlight	White LED	
	PPI	118 ppi	
	Viewing Angle	30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

15.6-inch LED FHD (1920 x 1080) anti-glare	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	220 nits (Typ)	
	Pixel Resolution	Pitch	0.179mm x 0.179mm
		Format	1920 x 1080
		Configuration	RGB Strip
	Backlight	White LED	
	PPI	142 ppi	
	Viewing Angle	60/60/50/50 (Left/Right/Down/Up) (minimum) or 70/70/60/60 (Left/Right/Down/Up) (typical)	
	Technology Type	18-bit Twisted Nematic (TN)	
	Colour Depth	6-bits/colour	
	Display Colours	Over 260 thousand colours (native mode)	
	Colour Gamut Coverage	60% of NTSC colour gamut	

Technical Specifications

15.6-inch LED FHD (1920 x 1080) anti-glare DreamColor	Active Area (W x H)	13.54 x 7.59 in (34.4 x 19.4 cm)	
	Diagonal Size	15.6 in (39.6 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	800:1 (min)	
	Refresh Rate	48Hz, 50hz and 60 Hz	
	Brightness	210 nits (Typ)	
	Pixel Resolution	Pitch	0.179mm x 0.179mm
		Format	1920 x 1080
		Configuration	RGB Stripe
	Backlight	RGB LED	
	PPI	142 ppi	
	Viewing Angle	±89° Horizontal, ±89° Vertical (typical)	
	Technology Type	30-bit In-Plane Switching (IPS)	
	Colour Depth	10-bits/colour	
	Display Colours	Over 1 billion colours (native mode)	

Colour Gamut Coverage	CIE1931 (x,y)	CIE 1976 (u',v')
NTSC	109%	129%
AdobeRGB	114%	127%
sRGB	154%	148%

Internal Storage

500 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

320 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm) or on some models 0.28 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

250 GB 7200 rpm SATA Hard Drive	Drive Weight	0.25 lbs (115g)	
	Capacity	250 GB	
	Height	0.37 in (9.5 mm) or on some models 0.28 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	Synchronous (maximum)	100 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	Single Track	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

256 GB 2.5-Inch SATA Solid State Drive	Weight	80.1 Grams	
	Capacity	256 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	SATA	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		220 MB/s	200 MB/s
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-7;SATA 2.6; DIPM	

Technical Specifications

160 GB 2.5-inch SATA Solid State Drive	Weight	78 Grams	
	Capacity	160 GB	
	Height	0.275 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	SATA	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		250 MB/s	70 MB/s
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-7 ;SATA 2.6; DIPM	

Optical Drives

DVD-ROM Drive	Access Times	Random	< 110 ms CD (typical)
			< 110 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X-DVD	Up to 10,800 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	None	
	Max Media Capacity (read)	8.5 GB	
	Transport	Tray Loading	

DVD+/-RW SuperMulti DL LightScribe Drive	Access Times	Random	< 150ms CD (typical)
			< 160 ms DVD (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X DVD	Up to 10,800 KB/s
		24X CD-R	Up to 3,600 KB/s
		16X CD-RW	Up to 2,400 KB/s
		8X DVD+R	Up to 10,800 KB/s
		8X DVD+RW	Up to 10,800 KB/s
		8X DVD-R	Up to 10,800 KB/s
		6X DVD-RW	Up to 8100KB/s
		4X - DVD+R Dual Layer	Up to 5,400 KB/s
		4X - DVD-R Dual Layer	Up to 5,400 KB/s
		5X DVD-RAM	Up to 6,750 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, LightScribe	
	Max Media Capacity (read)	8.5 GB	
	Max Media Capacity (write)	8.5 GB	
	Transport	Tray Loading	

Blu-ray R/RE DVD+/-RW SuperMulti DL Drive	Access Times	Random	<140 ms CD-ROM (typical)
			<160 ms DVD-ROM (typical)
			<300 ms BD-ROM (typical)
	Max Data Transfer Rate	24X CD-ROM	Up to 3,600 KB/s
		8X DVD-ROM	Up to 10,800 KB/s
		8X CD-R	Up to 1,200 KB/s
		8X CD-RW	Up to 1,200 KB/s
		8X DVD+R	Up to 10,800 KB/s
		4X DVD+RW	Up to 5,400 KB/s
		8X DVD-R	Up to 10,800 KB/s
		4X DVD-RW	Up to 5,400 KB/s
		2.4X DVD+R(9)	Up to 2,700 KB/s
		5X DVD-RAM	Up to 6,750 KB/s
		1X BD-ROM	Up to 4,500 KB/s

		1X BD-R	Up to 4,500 KB/s
		1X BD-RE	Up to 4,500 KB/s
	Transfer Mode	UDMA Mode 5	
	Interface	Gen 1 SATA	
	Supported Media (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW. DVD-RAM, BD-ROM, BD-R, BD-RE	
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, BD-R, BD-RE	
	Max Media Capacity (read)	50.0 GB	
	Max Media Capacity (write)	50.0 GB	
	Transport	Tray Loading	

Security

HP Fingerprint Sensor	Mobile Voltage Operation	3.0V-3.6V Single Supply
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images

Audio

Hardware	Implementation	IDT 92HD75B High Definition CODEC
	Touch-Sensitive Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes, dual-microphone array when equipped with optional webcam

Technical Specifications

Audio Output Quality	Frequency Response	20 Hz - 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHz - 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit
Integrated Stereo Speakers	Power Rating	2 Watts
	Impedance	4 Ohms

Communications

Integrated Intel Gigabit Network Connection (10/100/1000 NIC) 82567LM	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3z and 802.3ab; IEEE 802.3 clauses 34-42) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)
	Power Management	ACPI compliant -- multiple power modes Situation-sensitive features reduce power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable)
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Intel Advanced Management Technology (iAMT)
	Interface	PCI Express x1
	NIC Device Driver Name	Intel 82567 Gigabit Network Connection
Intel Centrino Ultimate-N 6300	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n* * In countries where 802.11n is not allowed, this capability is not enabled.

Interoperability	Wi-Fi certified (802.11bgn only) Cisco Compatible Extensions Program compliant (802.11bgn only) with Microsoft Windows Vista and XP
Frequency Band	2.4 GHz and 5GHz
Antenna Structure	3 transmit; 3 receive (3x3)
Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: many possible data rates, ranging from 6 Mbps to 450 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security[1]	Authentication: WPA and WPA2, 802.1x (EAP_TLS, TTLS, PEAP, LEAP, EAP-FAST) Authentication Protocols: PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2 Encryption: 64 and 128-bit WEP, AES-CCMP, CKIP, TKIP Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between Access Points
Output Power (for CCK and OFDM)[2]	17 dBm max
Power Consumption	Transmit: 2.4 Watts (max, with three spatial streams) Receive: 1.4 Watts (max with three spatial streams) Idle mode[3]: 35 mW (average) Radio off: 20 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	54 Mbps: -76 dBm, 6 Mbps: -92 dBm
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance
Form Factor	PCI-Express Half-MiniCard
Weight	0.0075 lb (3.4 g)
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
Operating Voltage	3.3V +/- 9%
Temperature	Operating 32° to 176° F (0° to 80° C) Non-operating -40° to 176° F (-40° to 80° C)

Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 90% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Intel Centrino Advanced-N 6200	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n* * In countries where 802.11n is not allowed, this capability is not enabled.
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows Vista and XP
	Frequency Band	2.4 GHz and 5GHz
	Antenna Structure	2 transmit; 2 receive (2x2)
	Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 66 possible data rates, ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification
	Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
	Security[1]	Authentication: WPA and WPA2, 802.1x (EAP_TLS, TTLS, PEAP, LEAP, EAP-FAST) Authentication Protocols: PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2 Encryption: 64 and 128-bit WEP, AES-CCMP, CKIP, TKIP Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
	Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK

Network Architecture	Ad-hoc (Peer to Peer)	
Models	Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between 2.4GHz band Access Points	
Output Power (for CCK and OFDM)[2]	17 dBm max	
Power Consumption	Transmit: 2.3 Watts (max, with two spatial streams) Receive: 1 Watt (max with two spatial streams) Idle mode[3]: 35 mW (average) Radio off: 20 mW (max)	
Power Management	ACPI compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	54 Mbps: -76 dBm, 6 Mbps: -92 dBm	
Antenna Connections	2 U.FL type connectors, 50 ohm nominal impedance	
Form Factor	PCI-Express Half-MiniCard	
Weight	0.0075 lb (3.4 g)	
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)	
Operating Voltage	3.3V +/- 9%	
Temperature	Operating	32° to 176° F (0° to 80° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 90% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

Technical Specifications

HP un2420 EV-DO/HSPA Mobile Broadband Module	Technology/Operating Bands	GSM/GPRS/EDGE: 850MHz(Cell), 900MHz(EGSM), 1800MHz(DCS), 1900MHz (PCS) UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900MHz (UTRA FDD Band II), 900Mhz (UTRA FDD Band VIII), 850MHz (UTRA FDD Band V) 1xEVDO/1xRTT with receive diversity: 850MHz (Band Class0-Cell), 1900MHz (Band Class1-PCS)
	Wireless Protocol Standards	GSM/GPRS/EDGE: Class B, Multi-slot operation, coding schemes CS1 - CS4 and MSC1 - MSC9. UMTS/WCDMA: Release 99 and Release 6 CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-2000
	Wireless Parametric Standards	Meets or exceeds TIA/EIA IS-98-D
	Maximum Data Rates	UMTS (HSPA) - 7.2 Mbps (Download), 2.0Mbps (Upload) CDMA (EVDO Release A) - 3.1 Mbps (Download), 1.8Mbps (Upload)
	GPS	Standalone GPS enabled
	GPS Bands	L1 - 1575.42 MHz
	Maximum Output Power	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+/-1) CDMA: 24dBm (+/-1)
	Maximum Power Consumption	2500mA (peak); 1000mA (average)
	Power Consumption, Sleep Mode	5 mA
	Power Management	USB selective suspend Integrated notebook wireless button
	Antenna Type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard, USB 2.0 interface
	Weight	11.5 g
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 5 mm)
	Voltage, Operating	3.3v +/- 10%
	Temperature, Operating (from TIA/EIA/IS-98-D)	-22° to 140° F (-30° to 60° C) (full RF performance) -22° to 167° F (-30° to 75° C) (reduced RF performance)
	Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
	Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	Configuration Utilities	HP Connection Manager
	LED Activity	LED Off - Radio Off; Solid LED On - Radio On
HP Integrated Module	Bluetooth Specification	2.1 Compliant

with Bluetooth 2.1 Wireless Technology	Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)	
	Frequency Band	2402 to 2480 MHz	
	Number of Available Channels	79 (1 MHz) available channels	
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps	
		Synchronous Connection Oriented links up to 3, 64 kbps, voice channels	
		Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric	
	Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)	
	Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate	
	Power Consumption	Peak (Tx) 264 mW	
		Peak (Rx) 231 mW	
		Sleep <1 mW	
	Antenna	Internally integrated within module	
	Range	Up 33 ft (10 m)	
	Electrical Interface	USB 2.0 compliant	
		Microsoft Windows Plug and Play compliant	
	Bluetooth Software Supported	Broadcom Bluetooth for Windows	
		Microsoft Windows Bluetooth Software	
	Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves	
	Security	Full support of Bluetooth Security Provisions	
	Power Management	Microsoft Windows ACPI, and USB Bus Support	
		Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff	
	Certifications	All necessary regulatory approvals for supported countries, including:	
		FCC (47 CFR) Part 15C, Section 15.247 & 15.249	
		ETS 300 328, ETS 300 826	
		Low Voltage Directive IEC950	
		UL, CSA, and CE Mark	
	Temperature	Operating	-4° to 158° F (-20° to 70° C)
		Non-operating	-40° to 176° F (-40° to 80° C)
	Humidity	Operating	10% to 90%
		Non-operating	5% to 95%
	Altitude	Operating	15,000 ft (4,572 m)
		Non-operating	40,000 ft (12,192 m)
	Bluetooth Profiles Supported	Serial Port Profile (SPP)[1]	
		Service Discovery Applicaton Profile (SDAP)	
		Dial-Up Networking (DUN)[1,2]	
		Generic Object Exchange Profile (GOEP)[1,2]	
		Object Push Profile (OPP)[1,2]	
		File Transfer Profile (FTP)	
		Synchronization Profile (SYNC)	

Hard Copy Cable Replacement (HCRP)[1,2]
Personal Area Networking Profile (PAN)[1,2]
Human Interface Device Profile (HID)[1,2,3]
FAX Profile (FAX)
Basic Imaging Profile (BIP)[2]
Headset Profile (HSP)
Hands Free Profile (HFP)
Advanced Audio Distribution Profile (A2DP)

[1] indicates the profile is supported by Microsoft Windows XP SP2
[2] indicates the profile is part of Windows Vista

Environmental Data

Eco-Label Certifications

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Star
- IT ECO declaration
- EPEAT - Gold where HP registers commercial desktop products. See http://www.epeat.net for registration status in your country.

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Convertible Mini tower Desktop model is based on a "Typically Configured Notebook"

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	17.14 W	17.95 W	17.05 W
Sleep (Energy Star low power mode)	1.278 W	1.335 W	1.28 W
Off	0.647 W	0.707 W	0.649 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	59 BTU/hr	61 BTU/hr	58 BTU/hr
Sleep	4 BTU/hr	5 BTU/hr	4 BTU/hr
Off	2 BTU/hr	2 BTU/hr	2 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.5	27.8
Fixed Disk (random writes)	3.5	27.8

System fan is usually off except when charging the battery

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

The battery type and chemistry used in the product is:
CR2032 (coin cell), Li-ion
6-cell high capacity Lithium-Ion battery (optional 8 cell available)

Additional information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see: www.epeat.net

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post consumer recycled plastic (by wt.)

This product is greater than 90% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - Paper 97 g
- Internal:
  - Polyethylene low density solid 13 g
  - Molded Pulp 100 g
  - Polyethylene low density 4 g
- The paper material is made from 80% recycled content.
- The Polyethylene low density solid is made from 100% recycled content.
- The Molded Pulp is made from 80% recycled content.
- The Polyethylene low density material is made from 100% recycled content.

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in

packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment: (http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm ^ 2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Environment website http://www.hp.com/environment Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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